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Local BIRD REFUGES

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Conservation
BULLETIN 17

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UNITED STATES DEPARTMENT OF THE INTERIOR
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Conservation Bulletin 17

LOCAL BIRD REFUGES

By

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BIRDS appeal strongly to the interests and affections of mankind. Not only do they charm by their graceful forms, harmonious colors, sprightly actions, and usually pleasing notes, but they have an even more important claim upon our esteem because of their great economic value.

Birds feed upon practically all insect pests. They are voracious, are able to move freely from place to place, and exert a steady influence in keeping down the swelling tide of insect life.

For economic as well as for esthetic reasons, therefore, an effort should be made to attract and protect birds and to increase their numbers. Where proper measures of this kind have been taken an increase of several fold in the bird population has resulted, with decreased losses from depredations of injurious insects.

This bulletin deals with the establishment of local refuges as a means of attracting birds and is adapted for use throughout the United States.

LOCAL BIRD REFUGES

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INTRODUCTION

BIRD CONSERVATION in the United States is a well-established policy that has been written into one of the best codes of State and Federal protective laws in the world. Originally, the basis of much of this legislation was the demonstrated practical value of birds as natural agencies in the control of injurious insects, but with the passage of time widespread appreciation of the birds' esthetic worth has developed into an effective country-wide bird-protective sentiment. Notwithstanding this fine public spirit for Nation-wide conservation, it is important that the human friends of the birds give practical attention to special local needs for their welfare.

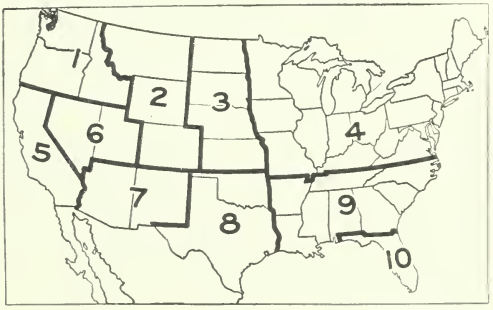

Figure 1.—**For each of the regions shown on this map, fruits attractive to birds are listed in mimeographed leaflets obtainable from the Fish and Wildlife Service. (See footnote 1.)**

One of the most effective ways of providing for birds is to develop various types of local refuges. In creating a useful bird refuge, the first step is to insure adequate protection against important bird enemies; the second, to see that plenty of nesting sites suited to the needs of various birds are available; and

NOTE.—This bulletin supersedes, with minor revisions, Farmers' Bulletin 1644, issued in 1931 by the U. S. Department of Agriculture—a contribution of the Bureau of Biological Survey, which was consolidated in 1940 with the Bureau of Fisheries to form the Fish and Wildlife Service, U. S. Department of the Interior.

the third, to improve food and water supplies, where necessary.[1] Instructions as to the use of nest boxes are contained in Conservation Bulletin 14, Homes for Birds, which is adapted to the whole country. Information on fruits attractive to birds in various regions of the United States (fig. 1) is given in mimeographed leaflets obtainable from the Fish and Wildlife Service.

BIRD REFUGES ON FARMS

Farmers, more than any other element of the population, will be interested in the establishment and maintenance of effective bird refuges, for the welfare of crops and the commercial success of the farm are intimately related to the numbers and kinds of birds present and to their economic tendencies. In the case of certain species that are more or less injurious, control measures are sometimes necessary, but the great majority of birds vary from slightly to almost exclusively beneficial in their relations to the farm. The useful species merit the fullest protection and should be encouraged in every possible way.

The value of birds lies chiefly in their destruction of injurious insects. Leading an active life, they require much food and are the most ravenous enemies of pests of this kind. The various groups of birds differ so much in habits that they feed upon practically all groups of insects; hardly an agricultural pest escapes their attacks. Among the well-known destructive insects preyed upon by numerous kinds of birds are the alfalfa weevil, the army worm, billbugs, the cotton-boll weevil, the brown-tail moth, chestnut weevils, the chinch bug, clover-root borers, the clover weevil, the codling moth, the cotton worm, cutworms, the forest tent caterpillar, the gypsy moth, horseflies, leaf hoppers, the orchard tent caterpillar, the potato beetle, the rice weevil, the 12-spotted cucumber beetle, white grubs, and wireworms.

In feeding on insect pests not only do birds take a great variety but they frequently destroy very large numbers. Often more than a hundred individuals are devoured at a meal, and in the case of small insects sometimes several thousand. With such appetites it is not surprising that occasionally birds entirely destroy certain insects locally. A number of cases are known in which trees, garden crops, and even farm fields have been entirely freed of insect pests by birds.

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[1] Addresses of dealers in devices for attracting birds and a list of publications on the subject available from other sources are obtainable on application to the Fish and Wildlife Service, Department of the Interior, Washington, D. C., as are also the following mimeographed leaflets on fruits attractive to birds in the various regions of the United States, as shown on the map (fig. 1): For *region 1*, Leaflet BS–41, Northwestern States; *region 2*, BS–42, Rocky Mountain States; *region 3*, BS–43, Northern Plains States; *region 4*, BS–44, Northeastern States; *region 5*, BS–45, California; *region 6*, BS–46, Great Basin States; *region 7*, BS–47, Southwestern States; *region 8*, BS–48, Southern Plains States; *region 9*, BS–49, Southeastern States; *region 10*, BS–50, Florida.

On a 200-acre farm in North Carolina it was found that birds were destroying a million green bugs, or wheat aphids, daily.

On the average there are in the United States only about two birds to the acre, but where they are protected and encouraged it has been demonstrated that a great increase over the normal bird population can be brought about. No fewer than 59 pairs to the acre is the figure reached in the most successful of these attempts reported. Bird counts as noted in many instances give an average of a pair of birds to the acre in the breeding season. Birds that pass through the United States to breed in the northerly parts of North America equal, if they do not surpass, in number the population of breeding birds.

The arid section of the United States has fewer birds than the humid, and if an estimate of one pair of birds to the acre is made for the humid regions, it will be safe to use half that number, or one bird to the acre, for the arid region. The totals reached from these calculations are more than 1,161,000,000 breeding birds for the arid, and more than 1,483,000,000 for the humid States.

For the purpose of computing their value in destroying pests, the breeding birds may be reckoned as preying upon them during 6 months of the year. The migrants that pass entirely beyond the borders of the United States may be estimated to spend a month on each northward and southward passage. Their repressive effect on insect and other pests is exerted therefore over a period one-third as long as that of the breeding birds.

By estimating the value of each breeding bird in the destruction of insects at only 10 cents a season (a purely nominal figure) and the value of the strictly migratory birds at one-third of that figure (3.3 cents), corresponding to the relative time they spend within the United States, and by using the numbers of birds to the acre noted before, a valuation of the services of birds is reached of nearly $200,000,000 for the humid region and more than $150,000,000 for the arid region. The total, $350,000,000, is about a fourth of a recent estimate ($1,590,040,500) of the total damage wrought by insects.

A particular farm may not have so large a bird population as it should, and therefore may not be deriving the benefit that is its due. The most effective means of increasing the number of birds is protection, and protection in its best sense is afforded by the establishment of bird refuges.

Bird refuges on farms have been most successful when established and maintained on a cooperative plan between the landowner or landowners and a State game commission, an Audubon society, a bird club, or a school. The owner agrees to the use of the land and acts as warden, and the other party to the contract furnishes and

places posters, bird houses, and feeding stations, or even stocks the refuge, as in the case of reservations for game birds. The beneficial effect that the establishment of a bird refuge has upon trespass problems is a great advantage to the farmer. A State law authorizing game wardens to proceed against trespassers on bird reservations greatly increases the effectiveness of private and cooperative bird refuges.

The cooperative bird preserve has been tried in many States as a means of establishing colonies of game birds, such as pheasants, and the plan has invariably proved popular and successful. As a method of protecting insectivorous birds it has been put into practice by schools, bird clubs, and Audubon societies in New Hampshire, Connecticut, Illinois, and Minnesota, at least, and has been found satisfactory and effective.

WOOD LOTS

As applied to wood lots, bird protection and attraction methods must be simplified. It is not feasible, as a rule, to adopt special protective measures, but vagrant cats and occasionally a sharp-shinned hawk, Cooper's hawk, or red squirrel can be eliminated from the farm.

If a wood lot contains no small streams, it will probably be impracticable in most cases to furnish water. If there is a water supply not far away, some birds no doubt will nest in the wood lot, but if there is none within easy flying range, the other woodland attractions will go for naught.

The provision of nest boxes is an obligation nowadays upon all who would help birds. No longer is there the profusion of decaying or dead trees containing cavities that once formed the natural homes of a whole series of valuable birds. Unless nest boxes are provided for these species, all but the most expert drillers among the woodpeckers, and the few birds that fall heir to their abandoned nest cavities, will become greatly reduced in numbers. These hole-inhabiting birds, as the woodpeckers, crested flycatcher, tree swallow, house wren, nuthatches, titmice, chickadee, and bluebird, are among the most valuable bird friends of the forest, and action should be taken in every wood lot to furnish them places to rear their young.

Besides protection, water, and nest boxes, the birds' food supply should receive some attention. It is easy, for instance, in clearing woodlands to spare, here and there, a Juneberry, raspberry, blackberry, elderberry, or mulberry bush. The presence of their favorite wild fruits will induce more birds to nest in the wood lot and will help them with their food problems. If wild berries are not already present, it will be well to plant some of the most favored kinds about the woodland margins. A list of these fruits will be found

in table 1, page 9, and the seasons when they are in bearing in the different sections of the country are given in the mimeographed leaflets mentioned on page 2.

Winter is the time of the birds' greatest need for artificial provision of food (fig. 2). The foods commonly used for winter feeding include suet or other fat, pork rinds, bones with shreds of meat, various seeds, and the like. The methods of making these supplies available to birds are as varied as the dietary itself.[2]

Feeding places for game birds and sparrows may be provided by erecting low hutches or making wigwamlike shocks of corn or grain sheaves under which food may be scattered. The opening should be to the south. These shelters should be inspected about once a

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Figure 2.—**Birds attracted by food in winter.**

week to see that they are not covered or blocked with snow, and to renew the food supply. If predatory animals are attracted to such spots, discontinue feeding there, scatter the food in a different place each time, and take steps to control the predators.

In thinning trees it would be well, also, to allow for entertaining some of the seed-eating birds. Alders and birches bear in their numerous cones a supply of seeds eagerly sought by redpolls, siskins, and goldfinches in winter. The winged fruits of ashes and boxelders are opened and the seeds eaten by pine and evening grosbeaks.

[2] For further information consult these Conservation Bulletins of the U. S. Department of the Interior: No. 1, Attracting Birds, and No. 13, Feeding Wildlife in Winter, obtainable from the Superintendent of Documents, Washington, D. C., at 5 and 10 cents each, respectively; and the processed leaflets named in footnote 1 (p. 2).

Larches, pines, and other conifers attract crossbills, as well as some of the species just mentioned.

A fundamental of forest protection is prevention of sweeping fires, which not only directly kill trees, especially those of the younger generation, but consume the humus so necessary to healthy forest growth and to water conservation. Fire also damages trees not killed, by rendering them more subject to attacks of insects and to decay. Prevention of fires is for the good of birds as well as of trees. The measures that are recommended to minimize damage by fire, such as spot burning of dense cover, cleaning out roads and trails as fire barriers and breaking up large woodlands into blocks by open fire lanes, also encourage the presence of birds. Birds are much more numerous around the margins and in openings of woodlands than in extensive dense forests, and in mixed plantings more than in pure stands.

Another good wood-lot policy that benefits the birds is excluding grazing animals, for the undergrowth is of importance in furnishing nesting sites and food for the birds and, together with the leaf mold, in maintaining a sufficient degree of humidity. Although it is contrary to general practice, foresters advise against grazing in wood lots. A closely pastured wood lot is recognizable at a glance; the ground is bare, puddled, and hard, and the undergrowth and limbs of the tree as high as the cattle can conveniently reach have been destroyed. The old trees are injured (stag-headed) by the compacting of the soil around their roots and by destruction of the humus layer, and reproduction is entirely prevented. Grazing and the continuous forest reproduction that is so necessary for profitable wood lots are incompatible.

Gradual rather than widespread cutting of wood lots is recommended, as it interferes less with general conditions favorable to trees and always leaves some of the older seed-bearing trees to provide for reproduction. This policy also is favorable to birds, for it permits most of them to resort to the same area year after year instead of seeking new homes, and in general involves the least change in the essential conditions of the environment. Indeed, practically everything that is good for maintaining the wood lot is good for birds.

ROADSIDES

Making bird refuges on farms, although of most direct interest to the farmer, is by no means the only activity along this line helpful to agriculture. Attracting birds to roadsides and rights-of-way, in particular, is of almost equal importance and furnishes a leading reason for urging a treatment of these public and semipublic travel ways that will not only increase their bird population but make them

more sightly. Both features will increase the value of the adjacent farms.

In many parts of the United States roadsides are shorn of their vegetation at least once a year, either as a result of local sentiment or of legal requirement. Consequently, many country roads are very uninviting in summer. Hot, and gray with dust, the highway stretches away before the traveler, often without a single tree to break the monotony of the view or afford relief from the rays of the sun. This baldness is brought about chiefly by two causes: (1) Fear that the roadside will unduly increase weeds and insect and rodent pests; and (2) lack of public spirit.

Fortunately, there are also in this country examples of well-kept parkways and boulevards bordering cultivated lands. Their ample parking is grown to grass and embellished with herbaceous flowering plants, shrubs, and trees. Yet the farm lands they border are neither overwhelmed by weeds nor devastated by insects and rodents.

The possibility of roadsides propagating vast numbers of noxious weeds may be viewed in more than one light. For instance, the mowing of waysides for long series of years has not done away with the need of cultivating adjacent crops; indeed it cannot, for cultivation is necessary for other reasons than the destruction of weeds, as the loosening and aeration of the soil, and water conservation. Furthermore, the degree of cultivation customarily given crops is sufficient to control all the weeds the land will grow, and this number is generally present, despite the razing of roadside growths. On the other hand, the lack of verdure and shade and the general dreariness of roadsides make the adoption of a different treatment of these most extensive public parkings very desirable. Placing vines upon fences and planting numerous shrubs and shade trees along the way will not only render the roads more attractive but will tend to keep down the dust.[3]

In the case of paved highways it has been demonstrated also that roadside trees prolong the life of the pavement by protecting it from extremes of temperature. This is particularly true of the heat of summer, which, depending on the nature of the pavement, may either expand it, causing the surface to be thrown into waves, or dry it out, forming cracks.

Another practical end of planting may be served by using nut-bearing trees, which could be made a definite source of revenue to the community. In choosing plants for roadsides, as elsewhere, be sure to omit the common barberry, which serves as an alternate host for

[3] In this connection consult Farmers' Bulletin 1482, Trees for Roadside Planting, issued by the U. S. Department of Agriculture, which may be obtained from the Superintendent of Documents, Washington, D. C., for 5 cents a copy.

wheat rust, and buckthorn, carrier of the crown rust of oats; gooseberries and currants, which have a similar relation to the white-pine blister rust; and the wild black cherry, which is a favorable nursery for tent caterpillars.

There can be no doubt that suppression of roadside vegetation is a potent factor in restricting the numbers of birds, and the ever-increasing tendency to allow fence rows the minimum of space has the same effect. Farmers may gain a planting row about every field by the destruction of vegetation along fences, but they lose the services of the birds, their good allies in fighting insects.

Shrubby fence rows are among the best harbors and nesting places of small birds, and it is certain that encouraging an abundance of birds to live on farms by such plantings is a profitable policy. More should be done to beautify roadsides and fence rows, not only as a measure to contribute to the comfort and pleasure of man, but also substantially to increase a great economic asset—the bird population of the country.

The windbreaks so useful on farms in prairie regions are in effect but shrubby fence rows magnified. Their utility in protecting crops from winds always is supplemented by that of furnishing nesting sites and cover for birds; a food-supplying function also may easily be added, for Russian-olive, buffaloberry, and hackberry, all good bird food plants, are highly recommended as windbreaks.

RIGHTS-OF-WAY

A number of railroad companies have already made considerable effort to beautify their rights-of-way and station grounds. In some places the roads are paralleled for many miles by hedges, and the land on either side of the tracks is covered by beautiful turf. Hedges, shrubbery, and flower beds are common about the stations. If this planting could be directed in part, at least, toward attracting birds, it would be very effective and great good would be done. If the clumps of shrubs were formed of kinds furnishing the birds food (see table 1) and more of them were placed along the rights-of-way, the hedges allowed to bear fruit, and the fence poles or possibly even some of the telegraph poles furnished with bird houses, thousands of birds could live where very few do now.

The suggestions made are by no means without practical value to the right-of-way itself. For instance, supplying bird boxes is the best method of preventing damage to poles by woodpeckers, which come anyway under present conditions and make their own homes. Hedges or fences densely covered with vines would decrease, if they would not entirely obviate, expenditures for the movable snow fences now extensively used.

The project of increasing the number of birds along rights-of-way should interest the agricultural-development bureaus of railroads. The small birds that are most easily encouraged when shrubbery, nest boxes, and water supply are provided are chiefly beneficial, and increasing their numbers would result in great destruction of insects on adjacent farms, a very practical bit of agricultural improvement.

COMMUNITY PARKINGS

The attractiveness of community parkings, including those of cities and villages as well as of rural areas, may well be enhanced by the presence of an abundance of birds. This can be effected without in any way detracting from the utility of these reservations for their leading purposes. Making community parkings safe for birds is the first step; they must actually be havens of refuge. In this connection may be cited the admirable law of the State of Oregon that provides that all incorporated towns and cities and all public parks and school grounds in the State shall be, without additional local or general legislation, bird and game sanctuaries.

TABLE 1.—*Groups of fleshy fruits*[1] *most attractive to birds throughout the United States*

Name of fruit[2]		Birds known to eat the fruit	
Common	Generic	Number[3]	Desirable kinds most fond of the fruit[4]
Juniper; red cedar[5]	*Juniperus*	54	Ruffed and sharp-tailed grouse, bobwhite, eastern flicker, mockingbird, robin, eastern bluebird, cedar waxwing, myrtle warbler, evening and pine grosbeaks, purple finch.
Greenbrier	*Smilax*	44	Ruffed and sharp-tailed grouse, bobwhite, wild turkey, eastern flicker, red-bellied woodpecker, mockingbird, catbird, brown thrasher, robin, hermit thrush, cardinal.
Bayberry	*Myrica*	86	Ruffed grouse, bobwhite, eastern flicker, red-bellied and downy woodpeckers, eastern phoebe, tree swallow, black-capped chickadee, Carolina wren, catbird, brown thrasher, hermit thrush, eastern bluebird, white-eyed vireo, myrtle warbler, meadowlark, eastern towhee.
Hackberry	*Celtis*	48	Gambel's and scaled quails, eastern flicker, yellow-bellied sapsucker, mockingbird, brown thrasher, robin, hermit thrush, eastern bluebird, cedar waxwing, cardinal.
Mulberry[6]	*Morus*	44	Yellow-billed cuckoo, red-bellied, red-headed, and downy woodpeckers, eastern kingbird, mockingbird, catbird, robin, wood thrush, cedar waxwing, red-eyed vireo, yellow warbler, orchard and Baltimore orioles, scarlet tanager, cardinal, purple finch.
Pokeberry	*Phytolacca*	53	Bobwhite, mourning dove, eastern flicker, eastern kingbird, mockingbird, catbird, robin, hermit, olive-backed, and gray-cheeked thrushes, eastern bluebird, cardinal, eastern towhee.
Sassafras	*Sassafras*	19	Bobwhite, eastern kingbird, catbird, robin, veery, red-eyed vireo.
Spicebush	*Benzoin*	17	Bobwhite, eastern kingbird, catbird, wood thrush, veery, red-eyed vireo.

[1] Barberries (*Berberis*), buckthorns (*Rhamnus*), and currants (*Ribes*) are omitted because they serve as alternate hosts of rusts, attacking wheat, oats, and white pine, respectively. Yews (*Taxus*), wild cherries (*Prunus*), and nightshades (*Solanum*) also are omitted as being dangerous stock-poisoning plants.

[2] Only those listed that have been found in the stomachs of 10 or more species of birds.

[3] Based on records of stomach analyses made by the Fish and Wildlife Service.

[4] Based on both stomach analyses and field observations.

[5] Carries apple rust; should not be planted near valuable orchards.

[6] Most birds eat mulberries. A list of 26 species observed to do so in Washington, D. C., was published in the report for 1890 (p. 285) of the Ornithologist and Mammalogist to the Secretary of Agriculture. A good many of the species are additional to those in the stomachs of which mulberries have been found.

TABLE 1.—*Groups of fleshy fruits most attractive to birds throughout the United States*—Continued

Name of fruit		Birds known to eat the fruit	
Common	Generic	Number	Desirable kinds most fond of the fruit
Apple	*Malus*	44	Ruffed grouse, bobwhite, ring-necked pheasant, eastern flicker, red-headed and Lewis' woodpeckers, mockingbird, robin, cedar waxwing, purple finch, pine grosbeak, red crossbill.
Chokeberry	*Aronia*	19	Ruffed and sharp-tailed grouse, bobwhite, brown thrasher, meadowlark.
Mountain-ash	*Sorbus*	14	Ruffed and sharp-tailed grouse, red-headed woodpecker, catbird, brown thrasher, robin, Bohemian and cedar waxwings, Baltimore oriole, evening and pine grosbeaks.
Juneberry	*Amelanchier*	42	Eastern flicker, red-headed woodpecker, catbird, robin, hermit thrush, veery, cedar waxwing, Baltimore oriole.
Hawthorn	*Crataegus*	39	Ruffed grouse, bobwhite, robin, purple finch, pine grosbeak.
Strawberry	*Fragaria*	53	Ruffed grouse, catbird, brown thrasher, robin, wood thrush, cedar waxwing, eastern towhee.
Raspberry, blackberry	*Rubus*	149	Ruffed and sharp-tailed grouse, bobwhite, eastern flicker, red-headed woodpecker, eastern kingbird, tufted titmouse, wren tit, mockingbird, catbird, brown thrasher, robin, wood and olive-backed thrushes, eastern bluebird, cedar waxwing, red-eyed vireo, orchard and Baltimore orioles, cardinal, rose-breasted, black-headed, and pine grosbeaks, eastern, spotted, and brown towhees, white-throated, fox, and song sparrows.
Rose	*Rosa*	42	Ruffed and sharp-tailed grouse, greater prairie chicken, bobwhite.
Crowberry	*Empetrum*	42	Ruffed grouse, pine grosbeak, tree sparrow, snow bunting.
Sumac[1]	*Rhus*	98	Ruffed grouse, bobwhite, valley quail, wild turkey, eastern and western flickers, red-headed and downy woodpeckers, phoebe, black-capped and Carolina chickadees, wren tit, Carolina wren, mockingbird, catbird, brown and California thrashers, robin, hermit and olive-backed thrushes, eastern bluebird, white-eyed vireo, Audubon's warbler, goldfinch, eastern towhee, golden-crowned sparrow.
Peppertree	*Schinus*	11	Robin, varied and hermit thrushes, cedar waxwing, phainopepla.
Holly	*Ilex*	49	Ruffed grouse, bobwhite, valley quail, eastern flicker, mockingbird, catbird, brown thrasher, robin, hermit thrush, eastern bluebird, cedar waxwing.
Supplejack	*Berchemia*	16	Mockingbird, robin.
Grape	*Vitis*	89	Ruffed grouse, bobwhite, wild turkey, eastern and red-shafted flickers, red-bellied woodpecker, eastern kingbird, mockingbird, catbird, brown thrasher, robin, wood thrush, veery, eastern and western bluebirds, cedar waxwing, cardinal.
Virginia creeper	*Parthenocissus*	39	Ruffed grouse, bobwhite, eastern flicker, red-bellied and red-headed woodpeckers, tufted titmouse, mockingbird, brown thrasher, robin, hermit, olive-backed, and gray-cheeked thrushes, eastern bluebird, red-eyed vireo, scarlet tanager, evening grosbeak, purple finch.
Buffaloberry	*Shepherdia*	19	Ruffed and sharp-tailed grouse, mockingbird, hermit thrush, pine grosbeak.
Wild sarsaparilla	*Aralia*	18	Ruffed grouse, bobwhite, robin.
Dogwood	*Cornus*	98	Ruffed and sharp-tailed grouse, bobwhite, eastern and western flickers, downy woodpecker, eastern kingbird, catbird, brown thrasher, robin, hermit, wood, olive-backed, and gray-cheeked thrushes, veery, eastern bluebird, cedar waxwing, red-eyed and warbling vireos, cardinal, evening and pine grosbeaks, purple finch, white-throated and song sparrows.
Sour gum, tupelo	*Nyssa*	40	Ruffed grouse, bobwhite, wild turkey, eastern flicker, brown thrasher, robin, olive-backed and gray-cheeked thrushes, eastern bluebird, cedar waxwing, purple finch.
Wintergreen	*Gaultheria*	11	Ruffed and sharp-tailed grouse, wren tit.
Bearberry, manzanita	*Arctostaphylos*	34	Dusky and ruffed grouse, valley and mountain quails, band-tailed pigeon, wren tit, fox sparrow.

[1] Only nonpoisonous species are considered.

TABLE 1.—*Groups of fleshy fruits most attractive to birds throughout the United States*—Continued

Name of fruit		Number	Birds known to eat the fruit
Common	Generic		Desirable kinds most fond of the fruit
Huckleberry	*Gaylussacia*	48	Ruffed grouse, robin, pine grosbeak, eastern towhee.
Blueberry	*Vaccinium*	93	Ruffed grouse, greater prairie chicken, sharp-tailed grouse, bobwhite, valley quail, wild turkey, eastern kingbird, black-capped chickadee, tufted titmouse, catbird, brown thrasher, robin, hermit thrush, eastern bluebird, cedar waxwing, orchard oriole, cardinal, pine grosbeak, eastern towhee, tree sparrow.
Beautyberry	*Callicarpa*	11	Bobwhite, mockingbird, brown thrasher.
Partridgeberry	*Mitchella*	10	Ruffed grouse, bobwhite.
Honeysuckle	*Lonicera*	20	Bobwhite, catbird, brown thrasher, robin, hermit and olive-backed thrushes, pine grosbeak, white-throated sparrow.
Snowberry, coralberry.	*Symphoricarpos*	36	Ruffed and sharp-tailed grouse, bobwhite, valley quail, varied thrush, evening and pine grosbeaks.
Blackhaw, cranberry-bush.	*Viburnum*	35	Ruffed and sharp-tailed grouse, yellow-billed cuckoo, eastern flicker, catbird, brown thrasher, robin, eastern bluebird, cedar waxwing, purple finch, pine and rose-breasted grosbeaks, common redpoll.
Elderberry	*Sambucus*	120	Ruffed grouse, valley quail, eastern flicker, red-headed woodpecker, eastern and Arkansas kingbirds, black phoebe, wren tit, mockingbird, catbird, brown and California thrashers, robin, olive-backed thrush, eastern and western bluebirds, phainopepla, red-eyed vireo, rose-breasted and black-headed grosbeaks, brown towhee, white-crowned sparrow.

MUNICIPAL PARKS AND PICNIC AND FAIR GROUNDS

Picnic grounds, fair grounds, and parks may be improved as places of public gatherings, recreation, and education by increasing their bird population. Moreover, the alterations that improve a park as a bird haven may, and should, themselves be made to add to its attractiveness. For instance, water is used to enhance the beauty of most parks, and a water supply is one of the most potent attractions for birds (fig. 3). Bird baths or bird fountains may take the form of small displays of water, which may be added to many parks without being obtrusive or in conflict with the general design.

An artistic martin house, well placed in one of the small open lawns that most large parks contain (fig. 4), would not only increase the beauty and interest of the park, but would add to its dignity by suggesting a specific usefulness for the space. As for nest boxes for other birds, they may be so inconspicuously placed that the chief evidence of their presence would be the increased number of birds and the lessened injury to vegetation by insect pests. The perfection of specimen trees in parks and the work of the tree surgeon on imperfect trees make it necessary to supply nest boxes if the hole-nesting birds are to have any chance of inhabiting parks.

Feeding stations for birds are made in a number of sightly designs, and the principles upon which they are built allow of their being extensively varied or incorporated into other park structures.

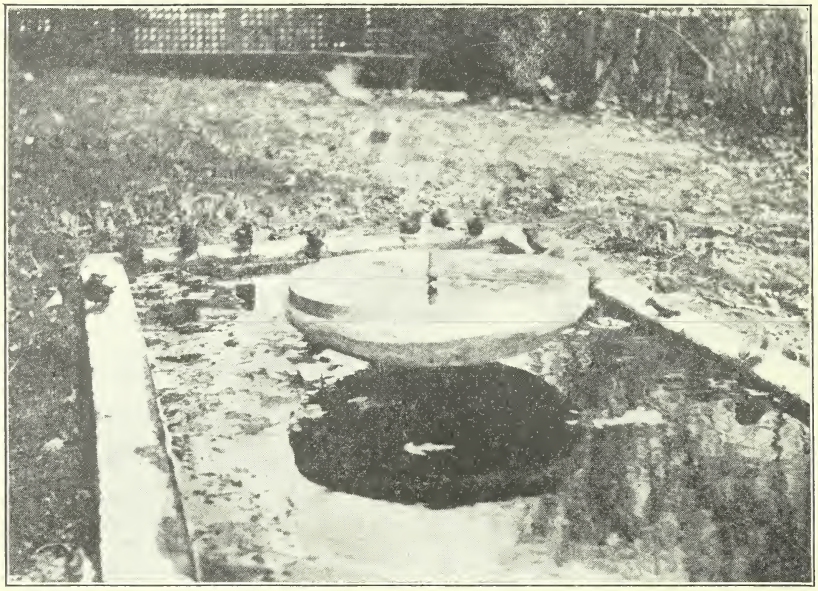

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Figure 3.—Cedar waxwings attracted to bird fountain.

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Figure 4.—Martin house and bird bath in parklike surroundings.

The greatest usefulness of feeding stations in parks, aside from the preservation of birds, is in rendering such places more attractive to the public in winter. The feeding of birds is carried on with most obvious results during the colder months, and adding this feature to parks appeals strongly to thousands of lovers of nature.

By means of feeding stations it is possible to attract to convenient observation points several species of the most interesting and valuable birds. Such stations are particularly pleasing to children. As evidence of the value of the method, the following statement of experience by the superintendent of parks, Minneapolis, Minn., is presented:

> For the past 5 or 6 years we have maintained a number of feeding stations in various parts of our park system, with very satisfactory results. I give you a list of the birds which stay with us over winter. The permanent winter birds found in the vicinity of our parks are the chickadee, blue jay, white-breasted nuthatch, downy and hairy woodpeckers, and screech owl; winter visitors, the redpoll, tree sparrow, and junco; irregular winter visitors, the evening grosbeak, Bohemian waxwing, and snow bunting. It is safe to say that a large number of these species are staying in the parks on account of the food supplied them. The feeding of the wild birds in the parks is a great success and will be continued.

Supplying water, nest boxes, and winter food goes far toward making a bird haven, but it is important also to supplement the summer food. This can best be done by planting fruit-bearing shrubs and trees. Shrubs and trees are essential elements of park composition, but according to the judgment of bird lovers better choice is distinctly possible than that often made.

The guiding principle in park planning should be beauty, but it should not be a temporary or one-season beauty. Hence it follows that shrubs and trees that produce colored fruits and retain them for long periods are preferable to plants whose chief decorative contribution is a short burst of bloom. Such shrubs are handsomer at all times after flowering and are particularly valuable in winter when every bit of color in the landscape is precious. They are valuable, moreover, in supplying bird food. The kinds preferred by birds are shown in table 1, and the species most suitable for various sections of the country are listed in the mimeographed leaflets mentioned on page 2. (See fig. 1 and footnote 1.)

A few further suggestions as to the use of fruit-producing plants are not out of place. The ideal American park is natural woodland, modified and embellished, or a planting that follows natural lines. Informal treatment is almost universally preferred to formal. From the standpoint of bird attraction this is fortunate, since continued clipping of shrubs either prevents or reduces the production of fruit and causes the plants to form such solid and dense surfaces that they

are uninviting to birds. It may further be said in favor of untrimmed shrubbery that the normal form and beauty of the plants, together with the resultant play of light and motion, are preserved. With this treatment a park has naturalness and life; under formal treatment the suggestions are those of restraint and immobility.

SCHOOL AND COLLEGE GROUNDS

Too often public-school grounds are bare and uninviting. How much better it is to clothe, shade, and adorn them with green![4] Flowers and trees will make the students more content with their surroundings, inspire them to better work, and enshrine the school grounds in pleasant memories delightful to recall in later years. Almost everything done to beautify the grounds will help to attract birds. Trees and shrubs cradle their young and supply much of their food.

The birds, the trees, and the flowers in themselves are a valuable educational resource, and are necessities for the proper conduct of classes in a nature study, now deservedly so popular. Building and placing bird houses could well be part of such a course, and the winter feeding of the birds would attract living objects of interest during the dormant season of the trees and shrubs. All children like birds and will protect and encourage them if only their early steps are guided right.

The college campus, like the park, has suffered from formal landscape gardening. Wall-like hedges, closely cropped circles, triangles of shrubs, and mathematically designed edgings, beds, and gardens have gone far toward robbing school grounds of merit in the eyes of man, and have almost spoiled them for birds.

In campus planning it is desirable to take the birds into consideration for the same reasons as in park planning. In addition there is the important objective of keeping up an important educational resource. There is hardly an advanced school in the country that does not offer one or more courses of bird study. The study of birds out of doors is essential to a good bird course, and this need should be kept in view by those in charge of college and school grounds. Sylvan campuses where formerly birds abounded have been so filled with buildings, so gardened and formalized, that birds are now scarce. If possible, some corner (preferably of original woodland, where that exists) should be allowed to run wild. Judicious addition of food-producing plants should be made there, and the campus in general improved for birds by allowing shrubs to

[4] Farmers' Bulletin 1087, Beautifying the Farmstead, may be consulted to advantage in connection with improving school grounds. This publication, issued by the U. S. Department of Agriculture, may be obtained from the Superintendent of Documents, Washington, D. C., for 5 cents a copy.

make natural growths. Providing nest boxes would make up for the hole-eliminating activities of the tree surgeon. Winter feeding would be very interesting and instructive to many students and could be carried on as part of the course of bird-study classes. Finally, the teacher of ornithology might well serve in an advisory capacity in relation to the planning and treatment of the campus.

CEMETERIES

Cemeteries have the reputation of being good places for birds. The reasons, one must infer, are seclusion, freedom from disturbance, and an abundance of trees and shrubs. The last-named factor is by no means least, nor, on the other hand, so satisfactory as not to be susceptible of improvement. Selection of shrubs and trees with the needs of birds in mind not only would not interfere with the general plan of a cemetery, but would make it a still better resort for birds.

Formal landscape gardening is more prevalent (perhaps excusably so) in cemeteries than in other public reservations, yet there are beautiful cemeteries in which formal composition plays little part. Here, as everywhere, the informal or naturalistic planting is most favorable to birds. Nest boxes can be added without being obtrusive, and bird fountains may be made to harmonize with the surroundings or even to serve as memorials.

RESERVOIRS

The grounds surrounding reservoirs of drinking water usually are well fenced and carefully guarded to minimize contamination. This results in freedom from disturbance, a boon so highly appreciated by birds that in itself it goes far toward making these places satisfactory bird havens. Such reservations can be greatly improved for this purpose, however, by the use of bird houses and by proper planting, measures that will be in no way deleterious to the water supply, but will greatly benefit the birds and through them the vegetation of the reserve and of the adjacent country.

Reservoirs other than for drinking water usually can be sown to aquatic plants, which will make them attractive to many water birds. The character of the planting will depend on circumstances: if a marshy margin is permissible, the place may be made into an excellent resort for wild fowl. If only submerged plants are desired and as clean a growth as possible, sago pondweed may be planted. Broader-leaved plants furnish much greater surface for the lodgment of silt and the growth of algae.

GOLF COURSES

There are numerous public golf courses, and many of those established by clubs are so surrounded by residences of members as to

become virtually community institutions. Golfers as a class are broadly interested in the out of doors, including its animal inhabitants, and most of them no doubt will be glad to cooperate in the preservation, encouragement, and increase of useful birds. In fact, considering the well-known utility of birds in destroying insect and other pests, golf clubs will only be furthering their own interests in preserving and propagating these natural enemies of the foes of their greens and fairways.

Golf courses, without special modification, present several features that are attractive to birds. The broad expanses of short grass on the fairways furnish excellent feeding grounds for robins, meadow larks, European starlings, flickers, and killdeers. The longer grasses and weeds of the rough, and scattered clumps of trees and shrubbery open to full light, support an abundant insect population, an important source of food for our feathered friends. Many birds find nesting sites also in the arborescent growths present and sally forth for food over the grassed areas, where they are often joined by numbers of those aerial feeders, the swallows and swifts, which find on these unobstructed reaches happy hunting grounds.

Such are the impressions from observations made on a golf course well situated for birds. There are courses not so fortunate, but all have the fundamentals of valuable bird refuges. Protected to a considerable extent from trespass, and relatively free from the natural enemies of birds, golf courses already have much of the safety required for sanctuaries. Birds promptly respond to protection, but it should be as complete as possible. So far as food is concerned, insects are plentiful on most golf courses, but it would help the birds and ornament the courses if shrubbery on the grounds were selected chiefly from species producing fruits fed upon by birds. Most golf courses, again, have water hazards at which birds can drink and bathe; but where these are absent or are far apart, bird fountains could easily be attached to hydrant supply pipes. These not only would be a boon to birds on hot summer days, but if placed in view of rest benches would be a source of interest and entertainment to members and visitors.

Protection, food, water—these are the things that usually are present in some degree and that may very easily be supplemented; but nesting sites, especially for some of the most useful birds, are scarce or lacking on most golf courses. Trees and shrubbery (the latter best if in tangled masses) will accommodate many birds; but the birds that nest in cavities can hardly find a home on improved lands, especially where tree surgeons have been employed. Fortunately these birds will occupy artificial cavities or nest boxes.

In most cases nest boxes must be supplied if golf courses are to be enlivened and benefited by such beautiful and useful birds as the

purple martin, the bluebird, the house wren, the tree swallow, the flicker, the white-breasted nuthatch, and the chickadee. At least twice as many other kinds of small birds have been known to occupy nest boxes. Placing nest boxes is work that can well be done in winter, a season during which, at least on northern courses, employees are but little occupied, and when members may welcome something to do out of doors.

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